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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/016,605

10/30/2001

Jack A. Mandelman

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11/18/2003

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EXAMINER

GEYER, SCOTT B

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/016,605

Applicant(s)

MANDELMAN ET AL.

Examiner

Scott B. Geyer

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☒ Claim(s) 10 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-11 in Paper No. 6 is acknowledged.

Information Disclosure Statement

2. The references cited within the IDS received on 10-30-01 have been considered.

Drawings

3. The drawings submitted by the applicant on 10-30-01 are acceptable.

Specification

4. The specification submitted by the applicant on 10-30-01 is acceptable.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant's claim 7 recites the punch-through doping pocket having a doping concentration of about " $1 \times 10^{18} \text{ cm}^{-3}$ or less". The reasonable interpretation of the ratio as claimed is $1 \times 10^{18} / \text{cm}^3$, which does not lend itself to a logical explanation. In other words, the applicant is claiming a concentration of

1,000,000,000,000,000,000 times per cubic centimeter, wherein the quantity has no units. As a reasonable interpretation cannot be gleaned from the applicant's concentration value, the claim will not be treated further on its merits.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-6, 8 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Hamamoto et al. (5,731,609).

8A. As to ***claim 1***, Hamamoto et al. teach a semiconductor memory structure having at least one adjacent pair of storage memory cells (see figure 66), in a silicon-containing substrate (see numeral 102). Each memory cell includes a vertical transistor (see numeral 108) and a trench capacitor (see numerals 104 and 105). The vertical sidewalls have strap out-diffusions (see numeral 106), and the strap out-diffusions connect the vertical transistors to the trench capacitors to the surrounding silicon containing substrate (see numeral 102). A punch-through stop doping pocket (see numeral 129) is located and centered between each pair of adjacent memory cells.

8B. As to ***claim 2***, Hamamoto et al. teach the punch-through stop doping pocket positioned at substantially the same location within the silicon containing substrate (see numeral 129, in figure 66). As to the language of claim 2, specifically "wherein a

plurality of...memory cells are employed" on lines 1-2, and "thereby eliminating alignment tolerance in the structure" on line 4, the applicant should note that this is merely intended use language which cannot be relied upon to define over Hamamoto et al., as Hamamoto et al. has taught each the structural limitations of the claim. Furthermore, the examiner will assume that the structural limitations as taught by Hamamoto et al., which are the same as claimed by the applicant, are for the same intended use.

8C. As to **claim 3**, Hamamoto et al. teach a trench capacitor comprising a buried plate diffusion region (see numeral 101, in figure 66) present about the storage trenches (see numeral 112), a node dielectric (see numeral 104) lining the storage trench and a N+ polysilicon layer present on the node dielectric (see numeral 105).

8D. As to **claim 4**, Hamamoto et al. teach a gate dielectric (see numerals 104 or 107, in figure 66) on the sidewalls of the storage trench and a N+ doped polysilicon gate conductor (see numeral 108) on the gate dielectric (see also column 11, lines 42-67, continued to column 12, lines 1-11).

8E. As to **claim 5**, Hamamoto et al. teach a vertical transistor and a trench capacitor separated by trench top oxide layer (see numeral 107, in figure 66).

8F. As to **claim 6**, Hamamoto et al. teach the punch-through stop doping pocket including a p-type dopant (see column 20, lines 51-67).

8G. As to **claim 8**, Hamamoto et al. teach wordlines atop each trench storage memory cell (see figure 1).

8H. As to **claim 9**, Hamamoto et al. teach the wordlines in contact with the vertical transistors by means of a contact plug (see wordlines in figure 1 and T-shaped plug in figure 2A).

Allowable Subject Matter

9. Claims 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record and to the examiner's knowledge do not teach or render obvious, at least to the skilled artisan, the instant invention regarding: wordlines including a conductive material, a nitride cap present atop the conductive material and nitride sidewall spacers present on the exposed sidewalls of the conductive material and the nitride cap, as recited in claim 10; and bitlines isolated from wordlines as recited in claim 11.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott B. Geyer whose telephone number is (703) 306-5866. The examiner can normally be reached on weekdays, between 10:00am - 6:30pm. E-mail: scott.geyer@uspto.gov

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (703) 308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

S.B.G. 11/7/03

SBG
November 7, 2003

David A. Zarneke
David A. Zarneke
Primary Examiner
11/10/03